## REMARKS

This amendment is submitted in an earnest effort to bring this application to issue without delay.

Applicants have withdrawn claims 9 through 13 and 21 through 24, withdrawn from further consideration, as directed to a non-elected invention. Applicants reserve the right to claim the non-elected subject matter in the canceled claims in a related application.

Applicants have amended claims 1 through 6 and 14 through 20 and added new claims 26 and 27 in order to more clearly define the invention and to more sharply focus on the nature of the invention. Antecedent basis for the amended claims and for the news claims may be found in the specification on page 4, last three lines, through page 11, line 7, and page 28, line 6 to the bottom, especially lines 21 through 25. Thus claims 1 through 8, 14 through 20, 26 and 27 are now in the application and are presented for examination.

In response to the objections to the claims on page 3 of the office action, Applicants have amended the claims to respond to the points raised by the Examiner with the exception of his complaint about the word "lesser". Applicants do not see anything wrong with use of the word "lesser" in the context of L-serine dehydratase expressed to a <u>lesser</u> degree. Applicants cite to the Examiner page 653 of the <u>Webster's New Collegiate Dictionary</u> (1981)

(copy enclosed) where "lesser" is defined as "of less size, quantity or significance." Here the extent of the expression of the L-serine dehydratase is of less quantity or significance and so Applicants have used the word "lesser" in a proper fashion.

In response to the rejection of the claims under 35 USC 112, second paragraph, as indefinite, as set forth on pages 4 and 5 of the office action, Applicants believe that the claims as now presented deal with all of the issues raised by the Examiner. Throughout the amended claims as attached, Applicants have deleted the expression "characterized in that." In claims 1 and 2, Applicants believe that the term "lesser" in "lesser extent" is not indefinite, but is entirely proper as has already explained in the preceding paragraph.

Applicants have also amended claims 1 and 2 to make it clear that the expression of the nucleotide sequence according to the invention is to a lesser degree than the expression of the naturally occurring L-serine dehydratase having a nucleotide sequence of Seq ID NO:1. Applicants have amended claim 1 to state that the polynucleotide sequence encoding L-serine dehydratase is partially or completely deleted or is mutated, or is expressed to a lesser degree than the expression of the naturally occurring L-serine dehydratase having nucleotide sequence of SEQ ID NO: 1 or which is not expressed at all. Applicants have amended claim 2, which is dependent upon claim 1, to state that the polynucleotide sequence encoding L-serine dehydratase is partially deleted or is mutated and expressed to a lesser extent in comparison with the

expression of the naturally occurring L-serine dehydratase having a nucleotide sequence of Seq ID NO:1 or not expressed at all.

Antecedent basis for these changes may be found in the specification on page 5, line 14 through page 7, line 20, especially on page 5, lines 14 to 16, and page 6, lines 11 through 13 providing antecedent basis for deleting the entire L-serine dehydratase sequence (sdaA), all 1449 nucleotides, as included in claim 1.

On page 4 of the office action, lines 6 through 11 from the bottom, the Examiner has questioned how the entire L-serine dehydratase sequence (sdaA) can be completely deleted as there would be nothing left of the polynucleotide sequence on which the Applicants could perform recombinant technology. However, such is not the case. The recombinant nucleic acid according to the present invention includes first of all at least one serine biosynthesis sequence selected from the group consisting of serA, serB, and serC. It is the serine biosynthesis gene that is expressed to obtain the enzyme needed to convert carbohydrates such as glucose to L-serine. The L-serine dehydratase sequence is a naturally occurring polynucleotide that expresses an enzyme that degrades the L-serine to pyruvate. If this sequence is deleted in its entirety, then the L-serine will not be degraded at all, and the presently claimed recombinant nucleic acid contains only the polynucleotide sequence that expresses the enzyme needed to prepare L-serine, and does not contain at all the polynucleotide sequence that expresses L-serine dehydratase, which undesirably degrades the L-serine to pyruvate. Such a recombinant nucleic acid will be valuable indeed.

In claim 3 last presented the Examiner has complained that the terms "homolog", "derivative", and "hybridizing conditions" are indefinite, and has rejected the claims under 35 USC 112, second paragraph. Applicants have amended claim 3 to define the homolog as having a sequence complementary to the nucleotide sequence, and have deleted the word "derivative" and have stated that the "hybridizing" takes place "under stringent conditions." Antecedent basis for these changes may be found in the specification in the paragraph bridging pp 10 and 11. Applicants have also included new claims 26 and 27, which define the nucleotide sequences of claim 3 even more sharply. In claims 14 and 15 Applicants have indicated that the expression of the recombinant L-serine dehydratase is to a reduced extent with respect to the naturally occurring L-serine dehydratase having SEQ ID NO: 1. Applicants have made changes in claims 16, 18 and 19 to delete the language to which the Examiner objects as not making any sense and have canceled claim 20. Applicants believe that all claims now presented are in full compliance with the requirements of 35 USC 112, second paragraph.

The Examiner has rejected claims 1 through 8, and 14 through 20 under 35 USC 112, first paragraph, as directed to subject matter that has not been adequately described in the specification. The Examiner further rejects the claims under the first paragraph of 35 USC 112, on the grounds that the

specification does not enable those "skilled in the art" to make and to use the present invention without the need to conduct undue experimentation. The Examiner argues that the specification does not disclose any form of L-serine dehydratase beyond the scope of the polynucleotide having SEQ ID NO: 1 where one or more residues from positions 506 to 918 are deleted. Applicants strongly disagree with both arguments under 35 USC 112, first paragraph.

Applicants have amended independent claim 1, and have explained in the remarks herein above, to make it clear that the polynucleotide sequence that expresses at least one serine biosynthesis sequence (serA, serB or serC) is the polynucleotide sequence that is needed to catalyze the conversion of a carbohydrate, such as glucose, to L-serine. The polynucleotide sequence L-serine dehydratase, which is also present as part of the recombinant nucleic acid for promoting microbial production of Lserine from the carbohydrates, is actually a factor that impedes obtaining the L-serine, because the expressed enzyme L-serine dehydratase facilitates the degradation of L-serine to pyruvate. Thus it is desirable to limit as much as possible the expression of the portion of the polynucleotide sequence that expresses L-serine dehydratase to prevent the undesired degradation of the L-serine dehydratase. The specification on page 6, line 11 through page 11, line 15 adequately defines the presently claimed recombinant nucleic acids , and adequately discloses how to make and how to use the presently claimed recombinant nucleic acids for promoting

microbial production of L-serine. Thus all claims now presented are believed top fully comply with the requirements of 35 USC 112.

The Examiner also questions in the central paragraph of page 6 of the what is the utility of the recombinant polynucleotide encoding L-serine dehydratase. Applicants have responded by amending the claims to make it clear that the utility of the recombinant polynucleotide encoding L-serine dehydratase is to promote microbial production of L-serine directly from carbohydrates by promoting expression of the also encoded nucleotide sequence expressing serA, serB and serC, and by avoiding or by at least reducing decomposition of the L-serine to pyruvate. Antecedent basis may be found in the specification (English language) in the paragraph bridging pp 3 and 4 and in the paragraph bridging pp 4 and 5. Thus all claims now presented comply with the description requirements and the enablement requirements of 35 USC 112, first paragraph.

The Examiner has rejected claims 1,2, 4 through 8, and 14 through 20, as last presented, under 35 USC 102(b) as anticipated by KUBOTA et al. The Examiner argues that KUBOTA et al discloses a mutant gene having a reduced sdaA activity and coryneform bacteria expressing said mutant gene. Applicants do not agree that KUBOTA et al anticipated under 35 USC 102 or renders obvious under 35 USC 103 any claim now presented. At the outset Applicants stress that KUBOTA et al discloses no structure of the polynucleotide sequence expressing L-serine dehydratase, nor any disclosure of how to specifically disclose the expression of the sequence. The

reference discloses undirected mutagenesis methods to increase the production of L-serine and to reduce the activity of the L-serine-dehydratase by 32%.

According to KUBOTA et al the cellular activity of Lserine dehydratase, which is responsible for the undesired L-serine
degradation, is decreased. As a result, the L-serine
concentration in Corynebacterium glycinophilum will be reduced.
This perception is a result of various experiences including
undirected mutagenesis methods. Because the method of mutagenesis
are undirected there is no knowledge about the reason why the Lserine production is increased. The best results which were
obtained by KUBOTA et al are a reduction in the activity of the lserine dehydratase by 32%.

Contrary to KUBOTA et al, Applicants have found the entire structure of the L-serine dehydratase gene, entirely responsible for the sdaA production. As a result Applicants are able to minimize or completely deactivate the activity of L-serine dehydratase by an action that is not accidental, but directed. In KUBOTA et al there is no disclosure of how to find the polynucleotide sequence which is able to control the expression of L-serine dehydratase, and there is also no sequence given. Thus Applicants believe that KUBOTA et al provides no basis to reject any claim now presented as anticipated under 35 USC 102 or as obvious under 35 USC 103.

Applicants would like to schedule a telephone interview with the Examiner to discuss the claims in this case and the KUBOTA et al reference, once he has had a chance to consider the Applicants' response.

Applicants believe that all claims now presented are in condition for allowance and a response to that effect is earnestly solicited. Applicants are enclosing a petition to obtain a one month extension of the term for response and PTO Form 2038, completed, to enable the undersigned to charge the cost of obtaining the extension to their credit card.

Respectfully submitted,

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PTO Form 2038

Webster's New Collegiate Dictionary, p. 653

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## WEBSTER'S

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## R'S

## New Collegiate Dictionary

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1 : any of the in stereoscopic or ations or grooves

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at LION] 1: a the 5th sign of the ne born under this

ardo da Vinci]: of,

B \lē-"ān->-,dēz\ (L point in Leo): one shower that recurs

con-, leo]: of, relat-



ana pipiens) that is lotches on the back; utheastern U.S. t. F aerial gymnast] s, a high neck, and

ankle-length legs worn for practice or performance by dancers, acrobats, and aerialists; also: TIGHTS
Lopcha \left\( \text{lepcha} \), \( n \) \end{align\* Lopcha or Lepchas 1: a member of a Mongoloid people of Sikkim, India 2: the Tibeto-Burman language of the Lepcha people \( \text{lepca} \), \( r \) \( \text{Impraction} \), \( r \) \( \text{Impraction} \), \( r \), \

leprosy 2: a person shunned for moral or social reasons: OUT-CAST
lepid- or lepido comb form [NL, fr. Gk, fr. lepid-, lepis scale, fr. lepid-): flake: scale (Lepidoptera)
lepid-olite \(\frac{1}{1}\): \(\frac{1}{1}\): \(\frac{1}{1}\) (\(\frac{1}{1}\): \(\frac{1}{1}\): \(\frac{1}\): \(\frac{1}{1}\): \(\frac{1}{1}\): \(\frac{1}{1}\): \(\frac{1}\): \(\frac{1}{1}\): \(\frac{1}{1}\): \(\frac{1}\): \(\frac{1}{1}\): \(\frac{1}\): \(\frac{1}\): \(\frac{1}\): \(\frac{1}\): \(\frac{1}\): \(\frac{1}\): \(\frac{1}\): \(\frac{1}\): \(\frac{1

of treasure if caught
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LL lep-ro-uy \u00e3-ep-ro-\u00e3\u00e3 n [lep-ros y patients
lep-ro-oy \u00e3-ep-ro-\u00e3\u00e3 n [lep-ros + -y] 1: a chronic disease caused
by a bacillus (Mycobacterium lep-ne) and characterized by the formation of nodules or of macules that enlarge and spread accompanied by loss of sensation with eventual paralysis, wasting of muscle, and production of deformities and mutilations 2: a morally
or spiritually harmful influence (the \u00b2 of poverty) --- lep-rot-ic
\u00e3\u00e3-om-\u00e3-circle \u00e3-om-\u00e3-circle \u00e3-om-\u00e3-circle \u00e3-om-\u00e3-circle \u00e3-om-\u00e3-circle \u00e3-circle \u0

or spiritually narmful influence (the ~ of poverty) — lep-rot-ic \le-prat-ik\ adj | ME, fr. LL leprosus leprous, fr. leprosus | lepr

lep-se\ n comb form [MF -lepsie, fr. LL -lepsia, fr. Gk -lepsia, fr. lepsia, fr. lepsia, fr. lambanein to take, seize — more at LATCH]

Jepsey \lepse\ n comb form \text{[MF -lepsia, Ir. LL -lepsia, Ir. lepsia, Ir. lepsia + Lepsia, Ir. lepsia + Lepsia, lepsia + Lepsia + Lepsia + Lepsia, lepsia + Lepsia + Lepsia, lepsia, lepsia + Lepsia, lepsia, lepsia + Lepsia, lepsia

lep-to-opi-ro-din \lep-to-spi-ro-sos\n pl-ro-des \-sēz\ [NL]: any of several diseases of man and domestic animals that are caused by infection with leptospires lep-to-tene \( \frac{1}{1} \) pl-to-tene \( \frac{1}{1} \)

BYN LESS, LESSER, SMALLER, FEWER shared meaning element: not as great (as in size, number, worth, or significance) as some expressed or implied other. In spite of the common element of meaning these terms are rarely interchangeable without loss of precision. LESS in its most characteristic use applies to matters of degree, value, or amount, is opposed to more, and chiefly modifies collective nouns or nouns denoting a mass or an abstract whole (the moon gives less light than the sun) Less is sometimes applied

to matters of number, but the usage is decried by many careful writers and speakers. LESSER applies especially to matters of quality, worth, or significance and is opposed to greater or major (God made... the lesser light to rule the night —Gen 1:16 (AV)) In vernacular names of plants and animals lesser specifically implies distinction based on relative smallness (the lesser yellowlegs) (lesser celandine) SMALLER is applicable especially to matters of size, dimension, or quantity and is opposed to larger (the advantage of smaller cars) (use a smaller amount of seasoning) FEWER profession, to matters of number and therefore requirity tage of smaller cars) (use a smaller amount of seasoning) FEWER applies specifically to matters of number and therefore regularly modifies a plural noun. Thus, "he has fewer (not less) spendable dollars this year," but "he has less (not fewer) money to spend than he used to." Occasionally the distinction between quantity and number is obscured and either fewer or less is appropriate (seasonal workers who average fewer (or less) than six months' work a year). Out more

(seasonal workers who average jewer (or less) than say thousand work a year) Ant more

2leno adv: to a lesser extent or degree — lens and lens: to a progressively smaller size or extent — lens than: by no means: not at all (was being less than bonest in his replies)

3leno prep: diminished by: MINUS

4leno n, pl tess 1: a smaller portion or quantity 2: something

of less importance

of less importance deno less importance dead less importance less in to OHG los loose, OE losian to get lost — more at LOSE]

1: destitute of: not having (witless) (childless) 2: unable to be acted on or to act (in a specified way) (dauntless) (fadeless)

lencoe \le-'sE\n [ME. fr. AF, fr. lessé, pp. of lesser to lease — more at LEASE]: one that holds real or personal property under a lease lencen \les-'n\ w lencoened; lencoen \les-'n\ w lencoened; lencoen \les-'n\ w lencoened; lencoening \les-'n\ i les-coened; lencoened; l

see DECREASE

lenser \laser\ adj: of less size, quality, or significance syn see

LESS ent greater, major

lesser adv: LESS (lesser-known)

Plesser adv: Less (lesser-known)
Lesser Bear n: URSA MINOR
Lesser Bear n: URSA MINOR
lesser celandine n: CELANDINE 2
lesser cornetalk boror n: a pyralid moth (Elasmopalpus lignosellus) whose slender greenish larva is a destructive pest that burrows in the stalk esp. of Indian corn near ground level
Lesser Dog n: CANIS MINOR
lesser peach tree borer n: a moth (Synanthedon pictipes family
Aegeridae) whose larva is a borer in the forks and crotches of
stone-fruit trees and esp. the peach
lesser ocaup n: a common No. American diving duck (Athya
affinis) similar to but smaller than the greater scaup with a purplish iridescence on the head of the adult male — called also lesser
scaup duck

plish iridescence on the head of the adult male — caused also reser scaup duck leader yellowlegs n pl but sing or pl in constr: a common American marsh and shore bird (Tringa flavipes) that closely resembles the greater yellowlegs in color and markings but is smaller with a shorter more slender bill 'leaden' resembles the greater yellowlegs in color and markings but is smaller with a shorter more slender bill 'leaden' resembles to read — nore at Legend' 1: a passage from sacred writings read in a service of worship 2 a: a piece of instruction: Teaching b: a reading or exercise to be studied by a pupil c: a division of a course of instruction 3 a: something learned by study or experience (his years of travel had taught him valuable ~s) b: an instructive example (the ~s history has for us) c: REPRIMAND 'leason vi leasonooned; leadon-ing \"les-onin, \"les-nin, \"les nin, \"les roight, \"les lesson to: \"lesson to: \"l

troublemaker)

let \( \text{Vet} \) vi let ted; letted or let; let ting [ME letten, fr. OE lettan to delay, hinder; akin to OHG lezzen to delay, hurt, OE læt late] archaic: HINDER, PREVENT

archaie: HINDER PREVENT

let n 1: something that impedes: OBSTRUCTION 2: a stroke in racket games that does not count and must be replayed

let vb let; let-ting [ME leten, fr. OE lætan; akin to OHG läzzan to permit, L lassus weary, lents soft, mild] vt 1: to cause to: MAKE (~ it be known) 2 a: to offer or grant for rent or lease (~ rooms) b: to assign esp. after bids (~ a contract) 3 a: to give opportunity to whether by positive action or by failure to prevent (live and ~ live) (a break in the clouds ~ him see his objective) b— used in the imperative to introduce a request or proposal (~ us pray) c— used as an auxiliary to express a warning (~ him try) 4: to free from or as if from confinement: RELEASE (~ the prisoner go) (she ~ out a scream) 5: to permit to enter, pass, or leave (~ them through) ~ vt 1: to become rented or leased 2: to become awarded to a contractor gyn 1 see HIRE

2 LET. ALLOW, PERMIT. SUFFER shared meaning element: to neither

syn 1 see HIRE 2 LET, ALLOW, PERMIT, SUFFER shared meaning element: to neither

2 LET. ALLOW, FERMIT, SUPPER SHAPE INCOMES.

forbid nor prevent

let \lat\ n suffix [ME. fr. MF -elet, fr. -el, dim. suffix (fr. L -ellus) +

-el] 1: small one (booklet) 2: article worn on (wristlet)

let alone prep: to say nothing of: not to mention (lacked the courage, let alone the skill, to be effective)

let-down \lat\left(let-\daum) n 1 a: DISCOURAGEMENT, DISAPPOINTMENT

b: a slackening of effort: RELAXATION 2: the descent of an air-

a abut \* kitten er further a back a bake ī life e less ē easy i trip aŭ out g gift ŋ sing ō flow o flaw oi coin th thin th this j joke y yet yü few yù furious

into a